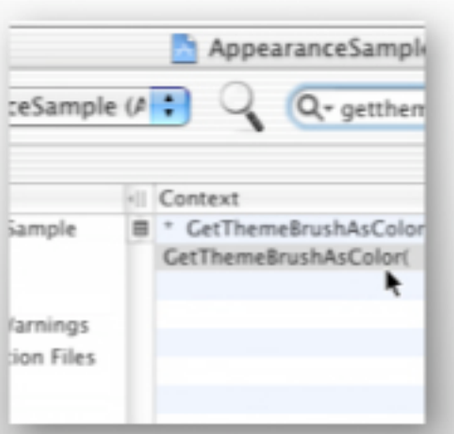
# Software Testing Tools for Mac OS X

## Session 311



# Software Testing Tools for Mac OS X

**Godfrey DiGiorgi**
Technology Manager, Development Tools

# Introduction

- Need for testing automation
- Apple solutions available today
  - AppleScript-based functional testing
- Eggplant from Redstone Software
  - User-centric testing

# What You'll Learn

- What GUI Scripting can provide
- All about Eggplant

# Testing With GUI Scripting

**John Comiskey**
Senior Software Engineer
AppleScript

# Section 508

- Federal Law mandating accessibility features
- Covers all hardware and software purchased by the Federal Government
- http://www.usdoj.gov/crt/508/508law.html

# Accessibility API

- Apple's response to Section 508
- It's in Jaguar, now!
- Accessibility Documentation
  - Go to http://developer.apple.com/ and search for "accessibility"

"Carbon Accessibility Documentation"
"Cocoa Accessibility Documentation"
"User Experience Accessibility Documentation"

# GUI Scripting

- AppleScript's response to Section 508
- Available in Panther Developer Preview now!
- Some interesting examples
  - http://www.apple.com/applescript/GUI/

# What Is GUI Scripting?

- An object model of the state of the user interface
- Each process contains a set of UI elements
  - e.g.: one menu bar and several windows
- Each UI element can contain other UI elements
  - e.g.: buttons, text fields, static text, scroll bars, etc.

# What Is GUI Scripting?

- Each UI element contains a set of attributes
- Attributes: Bits of data differentiate each UI element
- Attribute objects have a name and a value
- Some attributes defined as properties
  - Promotes easier access

# What Is GUI Scripting?

- Each UI element contains a set of actions
- Actions: What can be done to the UI element
- Action objects respond to the `perform` verb
  - Actions can also be verbs for easier access

# What Can GUI Scripting Do?

- Access attributes and actions of standard controls
- Test User Interface layer of any application
  …scriptable or not!
- Control behavior of some “unscriptable” applications

# What GUI Scripting Can’t Do

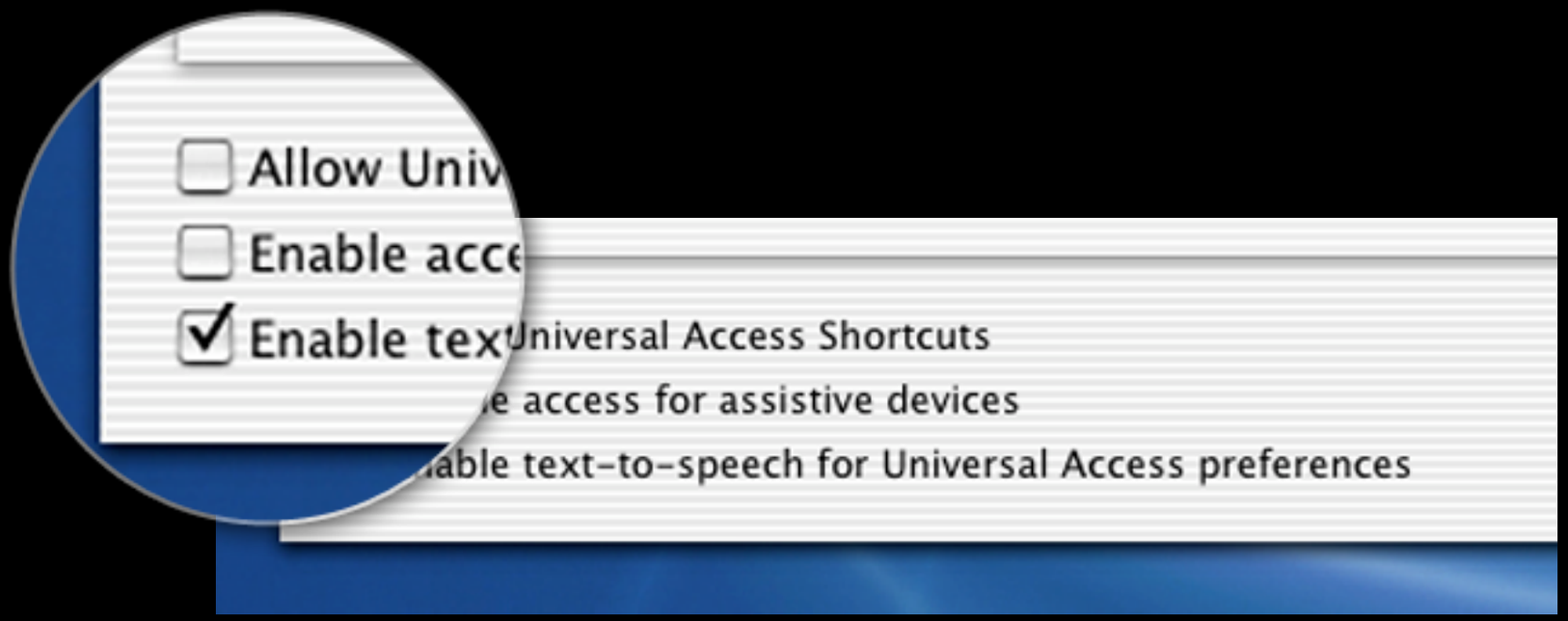
- Access attributes and actions of nonstandard controls
- Directly test the object model of an application
- Replace real, object model scriptability

# How Do I Use It?

- Enable the Accessibility API
- Identify the UI element of interest
- Identify the action desired
- Apply the action to the UI element

# Enable the Accessibility API

- Launch System Preferences
- Select the Universal Access pane
- Check “Enable access for assistive devices”



# Identify the UI Element of Interest

- Use a script to walk the containment hierarchy until the UI element is reached
- Use UI element Inspector to view the containment hierarchy
  http://www.apple.com/applescript/GUI/
- Use UI browser to “Generate AppleScript”
  http://www.prefab.com/uibrowser/

# Identify the Action Desired

- Use a script to access the actions
- Use UI element Inspector to view the actions
- Use UI browser to “Generate AppleScript”

# Apply the Action

- Use a script to apply the `perform` verb to the action object
- Use a script to apply the corresponding verb to the UI element object
- Use UI browser to “Generate AppleScript”

# Keystrokes

- Set standard text object values
  - Always better than sending keystrokes
- Nonstandard text objects *usually* require keystrokes
- Keystrokes always directed to the “focus” object
- Can change the focus:
  - `activate`
  - `set frontmost`
  - `click`
  - `select`

# Keystrokes

- `keystroke`
  - Translates MacRoman characters to virtual key codes
  - Does not handle other languages particularly well
- `key code`
  - Processes raw virtual key codes

# Demo

# Good Advice

“There's no substitute for true scriptability. To write an application of any serious power without giving it the ability to be driven with AppleScript is simply poor programming practice. So, if you're able to automate some previously unscriptable area of your workflow through Accessibility API scripting, that's splendid; but if the target program is still being actively developed, please do also write to the developers and ask that they make that same functionality genuinely scriptable.”

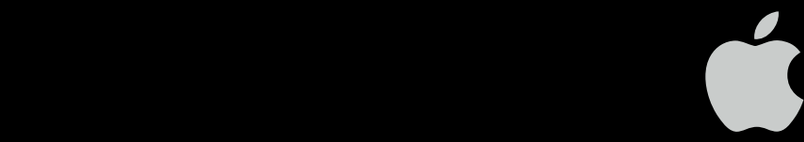
- Matt Neuburg
http://db.tidbits.com/getbits.acgi?tbart=07102

# Eggplant

**Doug Simons**
Senior Software Developer
Redstone Software, Inc.
doug@redstonesoftware.com

# Introduction

- Why test?
  - Mac OS users expect a high-quality experience
  - Reliable software reduces support costs
  - Better software == happy customers
- Why don’t people test?
  - Developers can’t test everything
  - Testing real-world interaction is difficult
  - Hiring testers is costly, in time as well as money
  - Tools are too hard to learn and use



# Testing Approaches

- Manual testing
  - Labor intensive
  - Hard to reproduce
- Hardware based
  - Inflexible
  - Platform specific
- Automated solutions
  - Hard to learn
  - Integrated into software being tested
  - Shelfware

# The Eggplant Philosophy

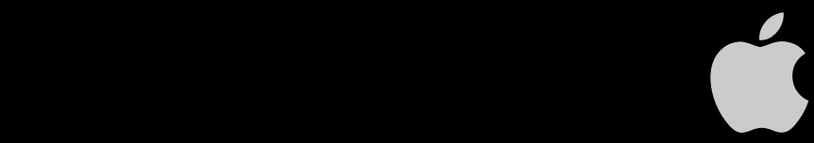
## Part 1: General

- Easy to learn and use
  - If it’s not easy, people won’t use it

# The Eggplant Philosophy

## Part 1: General

- Easy to learn and use
  - If it's not easy, people won't use it
- Powerful and elegant
  - Lean and mean, focused on essential testing functions
  - Flexible, to integrate with your environment



# The Eggplant Philosophy

## Part 2: Testing-specific

- Independent
  - No integration required
  - Not intrusive, doesn’t impact performance or behavior

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- Cross-platform
  - Because your software exists in a multi-platform world

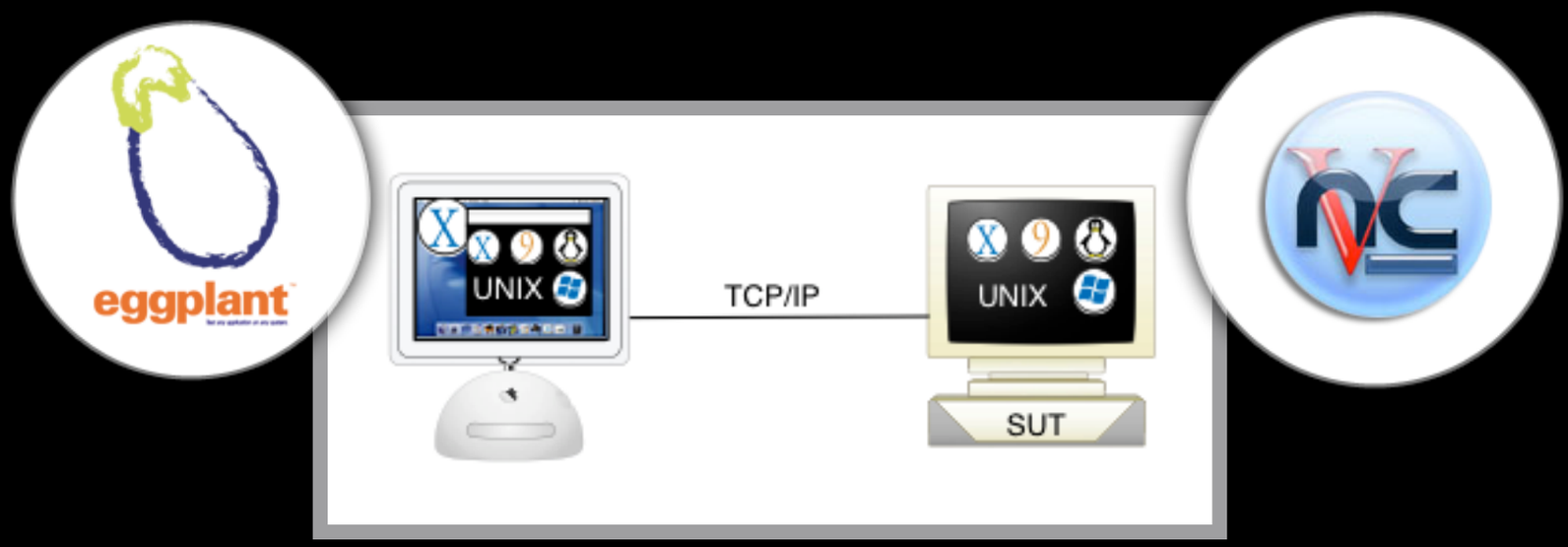
# The Eggplant Philosophy

## Part 2: Testing-specific

- Independent
  - No integration required
  - Not intrusive, doesn't impact performance or behavior
- Cross-platform
  - Because your software exists in a multi-platform world
- Test from the user perspective
  - That's the most important test

# How Eggplant Works

- Provides remote control of another computer
- Scripts automate any task
- Drives a remote machine through the User Interface



# Demo

**Jonathan Gillaspie**
Senior Software Engineer
Redstone Software, Inc.

# Technology and Benefits

- SenseTalk scripting
  - Easy to learn, understandable
  - Full-featured object-oriented language
- VNC (Virtual Network Computing)
  - Open protocol and open source
  - Separation from application and system
  - Controls other system just like a user
- Cocoa
  - Clean, intuitive Aqua interface
  - Allows us to be responsive to customers' needs

# Eggplant As a Tool

- Component of development process
- Can interact with other tools
  - Integrate with build process
  - Reporting tools
  - UNIX command line tools
  - AppleScript
- Remote testing
  - ADC compatibility labs

# Demo

**Jonathan Gillaspie**
Senior Software Engineer
Redstone Software, Inc.

# Beyond Testing

- Documentation
- Training
- Making movies: QuickTime recording
- System administration

# More Good Advice

"Redstone Software's Eggplant is, bar none, the best thing I saw at this Macworld Expo."

"…the only real way to test is to use the program like a normal user would, through the interface…"

"Eggplant is the solution, and a brilliant solution at that."

- Matt Neuberg

http://www.tidbits.com/tb-issues/TidBITS-664.html

# Wrap Up

**Godfrey DiGiorgi**
Apple Computer

# Summary

- Testing is important!
- AppleScript GUI Scripting
  - Functional testing, based on Section 508 compliance
  - Limited scope of capabilities
- Redstone Software's "Eggplant"
  - User-centric testing
  - Scriptable, cross-platform
  - Broad scope of capabilities

# How To Learn More

## AppleScript GUI Scripting

UI Element Inspector
http://www.apple.com/applescript/GUI/

UI Browser
http://www.prefab.com/uibrowser/

Go to http://developer.apple.com/ and search for “accessibility”

# How to Learn More

**Eggplant by Redstone Software, Inc.**
http://www.redstonesoftware.com

Eggplant CD Available here at WWDC

Apple's ADC Test Labs

http://developer.apple.com/labs/contact.html

# Who to Contact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**Redstone Software**
Visit our website for more information, Trial License
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**Jim Armstrong**
Technical Sales Engineer
jima@redstonesoftware.com


http://developer.apple.com/wwdc2003/urls.html

# Roadmap

**423 How to Write a Modern Carbon App**
Learn the latest techniques and concepts for Carbon

**Nob Hill**
**Fri., 2:00pm**

**FF017 Apple Developer Connection Feedback**
Give us your feedback

**North Beach**
**Fri., 2:00pm**

# Q&A

**Godfrey DiGiorgi**

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http://developer.apple.com/wwdc2003/urls.html

# WWDC 2003

Worldwide Developers Conference